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These studies are all based on the ear-to-row test. Dent corn only was used in these tests. They are not conclusive, but indicate the lines of attack, and this statement is presented at this time to call attention to the fundamental relation of these investigations to seed selection and the germination test. Approximately a hundred and fifty readings have been made on the mother-ear, seed, seedlings, and field performance of each of the ears. No ears are referred to herein which did not have a hundred per cent. germination record. The germination records are based on twenty kernels from each ear. The report of this year's work is corroborated by the results of the two previous years.

Some of the most important results of the experiments are:

(a) That barren stalks and stalks bearing only nubbins seem to be correlated with certain pathologic conditions in the plants. There is also a correlation between certain types of seedlings grown on a neutral-base germinator and the number of barren stalks that grow from the seed planted from the same ears.

(b) That in fifteen rows of corn grown this season from ears which present this pathologic condition in the seedlings, there were 15.2 per cent. of the plants barren, and 6.2 per cent. of the stalks bore nubbins only. In these rows 15.2 per cent. of the stalks were down by the end of the growing season. In fifteen rows of corn grown from ears not having seedlings which showed this pathologic condition, 6.3 per cent. of the stalks were barren, and 3.4 per cent. bore nubbins only. In these rows 3.1 per cent. of the stalks were down at the end of the growing season.

The computed difference in yield between these two series of rows was 22.6 bushels per acre. The rows were distributed throughout the test plot, the high-yielding and diseased rows alternating.

(c) That this pathologic seedling type is developed both on the neutral-base germinator and in sterile agar flask cultures.

(d) That surface sterilized seeds harbor bacteria and species of *Fusarium*. The bac-

teria cause a rotting of the seedling root tips in the sterile flask cultures. This rotting of the roots of the seedlings is the germination characteristic of the ears of corn which develop the greatest numbers of barren and down stalks in the field.

(e) By controlling fertilization by hand pollinating ears of apparently disease free plants with pollen from similar plants, the amount of barrenness in the rows from these ears was reduced to less than 1.5 per cent., and with but 1.2 per cent. down-stalks at the end of the growing season.

(f) All kernels from the same infested ear do not harbor pathogenic organisms within them. Neither is the rate of seedling development usually referred to as "vitality," a criterion for assuming freedom from infestation of the seed by bacteria and species of *Fusarium*. The rate of seedling development on the germinator is not indicative of the yield possibilities of that seed ear.

G. N. HOFFER,

PURDUE UNIVERSITY, LAFAYETTE, IND.

J. R. HOLBERT,

FUNK SEED CO., BLOOMINGTON, ILL.

## THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

### SECTION F (ZOOLOGY)

THE Convocation Week meetings of Section F (Zoology) of the American Association for the Advancement of Science were held in conjunction with those of the American Society of Naturalists at Pittsburgh, Pa., December 31, 1917, and January first, 1918. The meetings of Monday, December 31, were in charge of the officers of Section F and were presided over by Professor Herbert Osborn, professor of zoology in the Ohio State University and vice-president of Section F. In the absence of the secretary of the Section, Professor W. M. Smallwood, of Syracuse University, acted as temporary secretary.

At the business meeting of the Section, Professor L. B. Walton, of Kenyon College, was re-elected member of the council; Professor V. E. Shelford, of the University of Illinois, was chosen member of the sectional committee for five years; Professor C. H. Eigenmann, of Indiana University, was elected member of the general committee.

At the meeting of the sectional committee Professor William Patten, of Dartmouth College, was nominated as vice-president of the section for the ensuing year, and Professor Herbert V. Neal, of Tufts College, was reelected secretary of the Section for five years.

The following resolution, presented by Professor H. B. Ward, was unanimously adopted by the Section:

In the opinion of Section F it is important that in any plans formulated or arranged by the American Association for the Advancement of Science looking toward the organization and development of national or international bibliographic projects, the existing international bibliographic undertaking for zoology, *i. e.*, the Concilium Bibliographicum in Zurich, long approved by this Association and in part supported by numerous grants from its funds, be kept definitely in mind and included in any plan for bibliographic work presented for consideration by the special committee of the council.

The Section voted to recommend that the association make a grant of \$1,000 to Professor C. H. Eigenmann, of Indiana University, for the study of South American fishes.

Owing to the absence of Professor G. H. Parker, of Harvard University, the address of the retiring vice-president was not given. The address—upon “Some underlying principles in the structure of the nervous system” has appeared in *SCIENCE* (Feb. 15). The following papers were read:

1. *Some pathological phenomena following inhalation of chlorine gas*: H. R. HUNT AND W. H. SCHULTZ, West Virginia University.

The lungs of animals killed with chlorine gas show the following characters differing from those found in normal lungs:

1. Depending upon time of exposure and upon concentration of gas inhaled, chlorine gas causes an abnormal distribution of blood and fluid in the lungs. In more or less localized areas of lobules, there are varying degrees of congestion of arterioles. This may be associated with edema and hemorrhage causing hepaticization.

2. Histological study of hepaticized areas shows the following pathological conditions:

- (a) The arterioles of gassed lungs are filled with blood, often under such tension as to render the elastica interna nearly free from folding. There seems to be a concentration of cellular elements and a diminution of fluid content in the arterioles.

- (b) The media and adventitia of congested ar-

teries are edematous causing considerable thickening of these layers.

- (c) The capillaries frequently show small islands of corpuscles which apparently have been caught and retained in what appear to be constricted vessels and the arterioles supplying these vessels are greatly congested.

- (d) The nuclear membrane of “fetal cells” seems slightly irregular. It stains more deeply with hematoxylin, the nuclear material appears clumped into larger granules and the cytoplasm is less plump than normally. The latter takes on a bluish tinge with hematoxylin. Further study of the respiratory cells is necessary, but the indications are that chlorine and hypochlorous acid so alter fetal and respiratory cells of alveoli and the endothelium of capillaries that not only is circulation of corpuscles interfered with, but respiratory processes of alveolar tissue are retarded or prevented.

- (e) The alveoli of hepaticized areas contain fluid poor in cellular elements. Frequently much fluid pours into alveolar passages, extending to terminal bronchi and larger subdivisions of the bronchial tree. Usually, however, in these larger air passages the fluid is mixed with air and is frothy. Hence a freshly cut surface of gassed lung, though apparently dry, when gently squeezed is made to froth from the end of air passages. In the living animal the abundance of fluid in these air passages is evidenced by a pronounced rôle during respiratory movements.

2. *A comparison of the responses of representatives of different phyla from the protozoa to the mammalia, in gradients of environmental factors with particular reference to their method of reaction*: V. E. SHELFORD, University of Illinois.

The “general interest” session of Monday afternoon took the form of a symposium on the “Contributions of zoology to human welfare.” Papers were read by Dr. L. O. Howard and Professor H. B. Ward. The paper of Dr. Hugh M. Smith, commissioner of fisheries, who was unable to attend the meeting, was read by the secretary. These papers together with one by Professor M. A. Bigelow, who was unable to be present, will appear elsewhere in *SCIENCE*.

The meetings of Tuesday, January 1, were in charge of the officers of The American Society of Naturalists and have been reported in *SCIENCE* by the secretary of that society, Professor Bradley M. Davis.

HERBERT V. NEAL,  
Secretary